

What is claimed is:

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1. A device for manipulating a molecule *in vivo* relative to a target tissue comprising:
an elongated member;
at least two discrete electrodes affixed in axially spaced relation along the elongated member, each electrode being in circuit communication with a respective portion of a source of electrical energy, the discrete electrodes being configured to establish a first electromagnetic field *in vivo* between selected electrodes sufficient to cause an electromigration of a molecule relative to a target tissue and a second electromagnetic field sufficient to cause transient permeability of a cell membrane within the target tissue; and
an insulating material interposed axially between the electrodes for achieving relative electromagnetic isolation of the electrodes.
2. The device recited in Claim 1, wherein the second field is higher than the first field.
3. The device recited in Claim 1, wherein the elongated member is geometrically adapted for insertion into the target tissue.
4. The device recited in Claim 1, wherein the elongated member comprises:
an elongated core electrode comprising a conductive material;

3 a substantially nonconductive insulator sleeve positioned in surrounding relation to
4 a portion of the core electrode; and

5 an outer electrode positioned in surrounding relation to a portion of the sleeve, a
6 bottom portion of the sleeve protruding therefrom.

1 5. The device recited in Claim 4, wherein the sleeve has a bottom portion adapted to
2 protrude beneath a bottom of the outer electrode.

1 6. The device recited in Claim 4, wherein the outer electrode comprises a first outer
2 electrode and the sleeve comprises a first sleeve, and further comprising:

3 a second insulator sleeve positioned in surrounding relation to a portion of the first
4 outer electrode, a bottom portion of the first outer electrode protruding therefrom; and

5 a second outer electrode positioned in surrounding relation to a portion of the second
6 sleeve.

1 7. The device recited in Claim 6, wherein the first sleeve has a bottom portion
2 positioned to protrude beneath a bottom of the first outer electrode and the second sleeve has a
3 bottom portion adapted to protrude beneath a bottom of the second outer electrode.

1 8. The device recited in Claim 1, wherein the member comprises a plurality of members
2 configurable to surround a periphery of at least a portion of the target tissue.

1 9. The device recited in Claim 1, wherein the member comprises a pair of members
2 configured in spaced-apart relation and adapted to provide at least one pair of opposite-polarity
3 voltages approximately simultaneously on at least one electrode on each member.

1 10. The device recited in Claim 1, further comprising means for selectively activating a
2 selected plurality of electrodes in a predetermined pattern.

1 11. The device recited in Claim 1, wherein the electrodes are substantially simultaneously
2 activatable.

1 12. The device recited in Claim 1, wherein the member has a lumen therethrough
2 extending from an opening adjacent a top of the member to a portal positioned along the member
3 beneath the top opening for passing a substance therethrough to the target tissue.

1 13. The device recited in Claim 12, wherein the portal is positioned adjacent a bottom
2 tip of the member.

1 14. The device recited in Claim 12, wherein the portal is positioned along the member
2 adjacent an electrode.

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1 15. A device for manipulating a molecule *in vivo* relative to a target tissue comprising:
2 an elongated member;
3 at least two discrete electrodes affixed in axially spaced relation along the elongated
4 member, each electrode being in circuit communication with a respective portion of a source of
5 electrical energy, the discrete electrodes being configured to establish an electromagnetic field *in*
6 *vivo* between selected electrodes sufficient to cause at least one of an electromigration of a molecule
7 relative to a target tissue and transient permeability of a cell membrane within the target tissue; and
8 an insulating material interposed axially between the electrodes for achieving relative
9 electromagnetic isolation of the electrodes.

Sub. a1 > 1 16. A method for achieving an improved distribution and delivery of a desired molecule
2 from an initial body location into a target tissue comprising the steps of:
3 inserting at least one elongated member into a body generally adjacent a target tissue,
4 each elongated member having at least two discrete electrodes disposed in axially separated relation
5 along the elongated member, each electrode being in circuit communication with a respective portion
6 of a source of electrical energy, each pair of adjacent electrodes separated by an insulating material
7 interposed therebetween;
8 establishing a first electrical potential between a pair of electrodes sufficient to cause
9 electromigration of the desired molecule from the initial location to a location in the target tissue;
10 and

11 establishing a second electrical potential between a pair of electrodes higher than the
12 first electrical potential sufficient to cause electroporation in the target tissue for enhancing a
13 movement of the desired molecule into a cell thereof.

1 17. The method recited in Claim 16, further comprising the step of delivering a molecule
2 to the body tissue through a lumen in the member in communication with a portal positioned
3 adjacent the body tissue.

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